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ABSTRACT

This booklet contains an evaluation of the Urban Environmental Education Project instituted in the District of Columbia Public Schools. Data were obtained from interviews and questionnaires given to project staff, teachers, and students. Seven objectives were evaluated to rate the program: (1) assisting teachers in developing programs and materials, (2) arranging for school site development, (3) providing consultants, materials, and services, (4) providing teacher training, (5) contacting other agencies and resources, (6) arranging field trips, and (7) disseminating environmental education information. Three other areas were also evaluated. Conclusions and recommendations are listed in the report. (MR)

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Public Schools of the District of Columbia

A MODEL COMPREHENSIVE PROGRAM IN URBAN ENVIRONMENTAL EDUCATION

ESEA TITLE III EVALUATION
FINAL REPORT

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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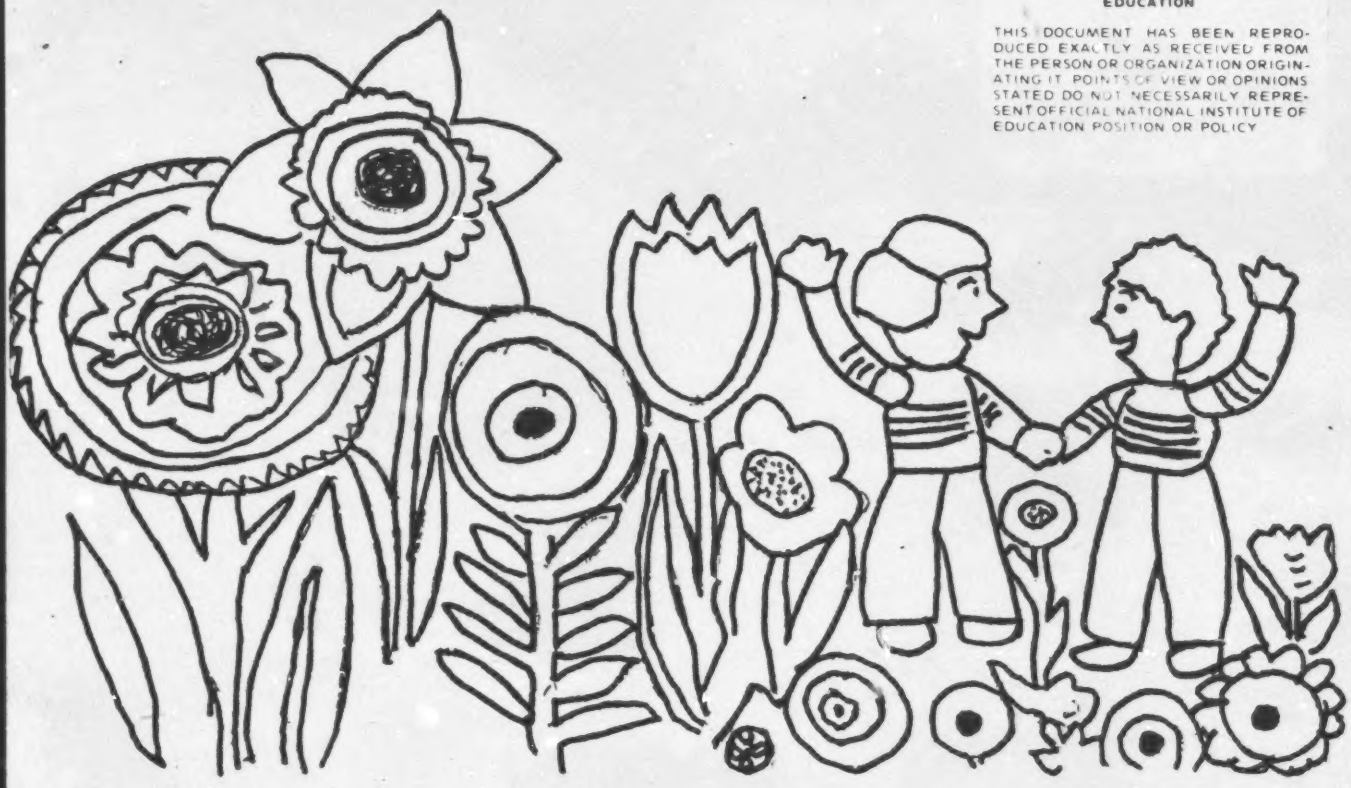

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1975

E R A N D A

FINAL EVALUATION REPORT ON
THE DISTRICT OF COLUMBIA PUBLIC SCHOOL'S
URBAN ENVIRONMENTAL EDUCATION PROJECT

July 31, 1975

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Introduction

This is the second in a series of two reports which constituted the evaluation of the District of Columbia Public School's Title III ESEA program titled "Urban Environmental Education Project." This report is the final report and focuses primarily on the product objectives and the accomplishments of the UEEP.

The information for this report was obtained from:

1. Interviews with Mrs. Hackney, the Project Director and her staff.
2. Questionnaire and interviews with those receiving services of the UEEP.
3. Student examinations and evaluations.
4. Data available from UEEP.
5. On-site observations.

General Comments

Year One was a typical first year during which the function of the UEEP was evolving and the role of staff members was being formulated. The curriculum development efforts were time consuming and there was no systematic effort to try out materials that were being developed. There were 7 elementary schools which served as Pilot Schools and these received extra attention from the staff. The Resource Center concept began to evolve during the first year. By the second year the major thrust of the program was to provide services to teachers within the district with a continued concentration in 7 pilot elementary schools. Curriculum development was continuing but was not an important aspect of the program. By the third year the UEEP had become a Resource Center with its full effort directed to providing services to district schools and teachers.

Over the three-year period the impact has been tremendous. Approximately 100,000 children have taken an environmental education field trip which was coordinated by the UEEP. The Lightship has been successful particularly at the elementary level where between 8,000 and 9,000 students have participated, and another 500 to 600 secondary students benefitted from that experience. The UEEP program has been very helpful in obtaining the services of various governmental agencies in providing services to schools within the district. The Lightship owned by the National Park Service was a good example. The school site development of Mr. Moody from the Department of Agriculture touched over 100 schools. The Darton Lab developed by the U. S. Geological Service is the newest and while it does not impact large numbers it looks like a very worthwhile program. In addition the UEEP has worked with many other agencies to provide services to the schools. Dissemination of materials has been voluminous. The "Enviroline" evolved during year two replacing a quarterly titled "Ecological News and Suggestions" which was published during the first year. It now is a fixture with 5,000 copies printed and issued monthly.

The ESEA Title III validation team confirmed the value of the project when it validated the program this spring. The Project Director, Mrs. Hackney, and her staff are justified in being proud of their contribution to the District of Columbia schools.

Resource Center

By far the single most important component of the Urban Environmental Education Project was the services it provided through its Resource Center function.

Objective 1: Project staff will work with teachers as consultants for development of programs and materials. Criterion will be log of such consultation and rating of at least 3 on a 5-point scale by 80 percent of teachers as to quality of service.

Objective 2: Project staff will arrange for school site development. Criterion will be evidence that schools have received this service and will rate quality of service at least 3 on a 5-point scale.

Objective 3: The Project Staff will act as clearinghouse for materials, consultants, and services upon request of teachers, students and administrators. Criterion will be log of requests and determination as to how request was handled and card catalogs of resources, both human and material, being kept.

In March, 1975, the UEEP staff asked teachers to respond to a questionnaire which was designed to rate the quality of service provided by the UEEP and to ascertain what degree of positive behavioral change had taken place as a result of UEEP activities. The questionnaire was divided into several parts and teachers were requested to complete only those sections covering services or activities which they actually utilized.

Table I indicates that 156 out of 165 teachers completing the ratings of UEEP on general services rated these services as good or very good. The mean rating was 4.37 on a 5-point scale, which was considerably above the criterion of 3.0.

TABLE I

TEACHERS' RATINGS OF UEEP SERVICES

N = 165

Area of Service	Very Good	Good	Fair	Poor	Very Poor	Mean Rating
General Services	70	86	9	0	0	4.37
Environmental Trips	52	23	4	0	0	4.61
Workshops and Faculty Presentations	7	14	5	0	0	4.08
School Yard Improvement Projects	36	18	3	0	0	4.58

For those teachers taking advantage of UEEP services in coordinating environmental education trips 75 of 79 rated this area of service as good or very good. The workshops and faculty presentations were rated as good or very good by 21 out of 26 who attended these sessions. Finally, services

provided in School Yard Improvement, which is another title for school site development, were rated as good or very good by 54 out of 57 teachers. The services in no case were rated lower than 3 or fair. The mean ratings for the services ranged from 4.88 for workshops and faculty presentations to 4.61 for environmental trips. In each the criterion of a mean rating of 3 or better on a 5-point scale has been greatly exceeded.

Objective 3 indicated a log of requests and the determination of action on each request would be maintained. The logs were observed by ERANDA staff members and found to be in order. Data on some of the requests are referred to under Objective 5.

In an attempt to obtain some feel for the impact of the program's services on the children, teachers were asked to indicate the percentage of children in their classes who experienced positive behavioral changes. In an attempt to obtain teacher perceptions of the impact of the program's services on students in their classes, 20 teachers who attended an environmental education workshop conducted by the UEEP were asked to indicate the percentage of children in their classes who experienced positive behavioral changes. Seventeen of the 20 teachers responded to the questionnaire. Table II indicates that 5 of the teachers indicated that 100 percent of their students showed an increase in environmental awareness after they participated in the faculty workshops, while 8 others indicated that 75 percent of their students showed improvement in this area and 4 more indicated about half had shown improvement in environmental awareness. Four teachers indicated 100 percent showed improvement in their concern for the environment, while 8 said 75 percent had shown this improved concern and 3 more said half had shown improvement.

TABLE II

PERCENTAGE OF POSITIVE BEHAVIORAL CHANGES IN ELEMENTARY STUDENTS AS A RESULT OF TEACHER PARTICIPATION IN FACULTY WORKSHOPS

N = 17*

	Number of Teachers Reporting Percentage of Students Demonstrating Behavior				
Behavior	100%	75%	50%	25%	0%
Environmental Awareness	5	8	4	0	0
Environmental Concern	4	8	3	0	0
Environmental Knowledge	4	10	0	0	0
Academic Interest and/or Achievement	5	7	3	0	0

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

When asked what percentage of their students showed improvement in environmental knowledge, 4 teachers said 100 percent had improved while 10 others said 75 percent of the students had shown such improvement. Five teachers indicated that 100 percent of their students had shown improvement in academic interest and/or achievement, 7 said 75 percent of their students had shown improvement and 3 indicated about half had shown improvement. The criterion for each of the first three objectives was met.

Objective 4: The Project Staff will provide in-service training to teachers on environmental education. Criterion will be rating of at least 3 on a 5-point scale by 80 percent of teachers undergoing in-service training as to quality.

A staff development workshop was conducted for 20 elementary school teachers who attended voluntarily on their own time. Upon completion of the workshop UEEP staff administered an evaluation form which they had developed. Teachers were asked to state their objective in attending and 9 indicated their objective was to develop teaching methods for environmental education. Five more indicated they wanted to find out how environmental education correlates with other subjects, 4 indicated they wanted to learn more about environmental education and 3 said they wanted to find ways to help students better understand the environment. When asked whether or not their objective was met, all 20 indicated "yes." Table III shows that 5 indicated they knew nothing about the learning material before the workshop, 14 knew some and 1 knew all about it prior to the workshop. Sixteen indicated there was perfect balance in difficulty while 4 said it was quite easy. When asked to rate how clear the procedures were 13 said they could follow the directions very easily and 7 said directions were clear enough. When asked to rate how clear the workshop's purposes were when finished, 10 said they were perfectly clear and 9 said they were clear enough. They were then asked to rate how well the workshop achieved its purpose and 8 said perfectly while the other 12 said well enough. The last question asked for suggestions for improvement and two indicated there should be a follow-up visit, two said there should have been more time, one said it should be conducted with students and another said the curriculum should be given to teachers.

No attempt was made to ascertain the quality of the workshop, however, from item six quality could be inferred. All 20 teachers rated the achievement of the workshop purpose as 3 or better on a 4-point scale, thus greatly exceeding the criterion.

TABLE III

TEACHER EVALUATION OF ENVIRONMENTAL EDUCATION WORKSHOP

1. Were your objectives met? Yes 20 No 0

2. Mark an X to show how much of the learning material you already knew before doing this activity.

I knew	I knew some	I knew all
5 nothing	14 of what it taught	1 that it taught

3. Mark an X to show how you would rate its difficulty.

Too easy to	Quite	Perfect balance	Quite
0 be useful	4 easy	16 in difficulty	0 difficult

Too difficult
0 to be useful

4. Mark an X to show how clear the procedures were.

I could not figure out what	Directions were hard	I had minor
0 to do at all	0 to understand	0 difficulties

Directions were	I could follow
7 clear enough	13 directions very easily

5. Mark an X to show how clear the workshop's purposes were when you finished.

I still have no idea of	I was a little	Clear	Perfectly
0 its purpose	0 uncertain	9 enough	10 clear

6. Mark an X to show how well you think the workshop achieved its purpose.

It doesn't	It achieves	Well	
0 even begin	0 a little	12 enough	8 Perfectly

As an additional service this year, the UEEP conducted a Pre-Service Environmental Education Workshop for 15 undergraduate students at Catholic University. Utilizing the same workshop educational form, 11 said their objective was met in attending the workshop while 4 did not respond to the item (see Table IV). When asked how much of the learning material you already knew before the workshop, 2 said they knew nothing and 13 said they knew some of what was taught. In rating the difficulty, 14 said it was perfect in balance and one did not respond. Directions were hard to understand for 1 student, 1 had minor difficulties, 4 said they were clear enough and the remaining 9 indicated they could follow the directions very easily. Ten indicated the workshop's purpose was perfectly clear and 5 said that it was clear enough. When asked to rate the extent to which the workshop achieved its purpose, 11 said perfectly and the other 4 said well enough. The workshop seemed to be quite a success in the eyes of the student participants. The results of these evaluations cited in Tables I, II and III indicate that the criterion for Objective 4 has been exceeded.

TABLE IV

PRE-SERVICE TEACHER EVALUATIONS OF ENVIRONMENTAL WORKSHOP
N = 15*

1. Were your objectives met? Yes 11 No 0

2. Mark an X to show how much of the learning material you already knew before doing the activity.

I knew	I knew some	I knew all
2 nothing	13 of what it taught	0 that it taught

3. Mark an X to show how you would rate its difficulty.

Too easy to	Quite	Perfect balance	Quite
0 be useful	0 easy	14 in difficulty	0 difficult

Too difficult
0 to be useful

4. Mark an X to show how clear the procedures were.

I could not figure out what	Directions were hard	I had minor
0 to do at all	1 to understand	1 difficulties

Directions were	I could follow
4 clear enough	9 directions very easily

5. Mark an X to show how clear the workshop's purposes were when you finished.

I still have no idea of	I was a little	Clear	Perfectly
0 its purpose	0 uncertain	5 enpugh	10 clear

TABLE IV (CONTINUED)

6. Mark an X to show how well you think the workshop achieved its purpose.

It doesn't	It achieves	Well	
0 even begin	0 a little	4 enough	11 Perfectly

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

Objective 5: The Project Staff will call upon others to lend assistance in the form of consultation, materials or advice for environmental education projects. Criterion will be existence of list of those who have contributed.

In performing its function as a Resource Center, the UEEP provided many services. Records of requests were maintained and the extent to which they were fulfilled was noted. The following is a description of those activities during 1974-75.

Sample Teacher Resource Kits. The UEEP staff developed a sample resource kit which included many and varied items dealing with environmental education. The packet included materials made available by commercial firms such as MacDonald's, General Motors, Mobil Oil, Pepco, Allied Radio Shack, non-profit agencies such as the Thomas Alva Edison Foundation and various governmental agencies. Included also were brochures, stickers, Johnny Horizon Environmental Education materials and Pitch-In bags, buttons and books. Materials dealt with topics such as soil conservation, population control, survey results, air pollution, water pollution, energy problems and wildlife conservation.

The UEEP staff had processed 564 requests from teachers for packets. This was up from the 107 requests processed in 1973-74.

Materials and Equipment. The UEEP staff has garden tools, photographic equipment, projectors, soil test kits, water test kits, laboratory equipment, records, films, games and other such materials which are made available upon request. During the year requests were made and filled for 51 schools which was up from the 23 requests filled during the 1973-74 school year.

Consultants and Speakers. Services of various individuals from the federal government, UEEP staff and members of the community are made available to the schools. During the year, 15 consultants provided their services which was down from the 25 for 1973-74. However, Mr. Moody's services on school site analysis and development went up to 65 schools this year, up from the 37 schools last year. Only 8 speakers were provided this year as opposed to 39 speakers last year.

Enviroline. The UEEP publishes a newsletter called "Enviroline," which is published monthly. The publication contains news, information, activities and suggestions and is often accompanied by environmental education resources. This year there were 5,000 copies issued each month for the first eight months. Additional requests for copies were received from 48 schools during the year and 1,504 additional copies were distributed bringing the total to 41,504. The first publication was issued in October, 1973, and a second was published in January, 1974. The two issues of 5,000 each and additional requests from 20 schools totaling 450 brought last year's total to 10,450.

During the year there were 28,000 resources sent to schools along with the "Enviroline" compared to 3,000 resources forwarded last year.

In-Service Workshops anf Faculty Presentations. During the year workshops and presentations are given to faculty upon request. There were 19 workshops and 3 faculty presentations during the year compared to 18 workshops and 10 faculty presentations in 1973-74.

Field Trips. The UEEP staff acts as the coordinator for field trips for District of Columbia schools. Trips are arranged for the Frederick Douglas Home, Rock Creek Nature Center, Environmental Protection Agency, Oxon Hill Farm, Fort DuPont, Aquatic Gardens and Envirovan (a mobile lab which is housed permanently in Fort Slocum Park and students go to the van).

A total of 26,445 students had participated in field trips to sites compared to 40,760 last year. The main reason for the drop is a cut back in transportation by the District this year.

Miscellaneous. Many requests for materials are handled over the telephone. This year there were typically about six phone calls per day, which was up over the typical daily rate of four from last year. The staff continued to disseminate materials which had previously been developed. Issues of the publication titled "Ecological News and Suggestions" last year centered on a particular theme. There were three such issues--one titled Reading and the Environment, a second titled Energy and the Environment and a third on Mapping and the Environment. The Mapping and the Environment publication was revised. One thousand issues of the Reading and Mapping issues were distributed this year and 700 copies of

the energy issue were distributed. Another publication on Arbor Day developed last year was reissued also. There were 2,000 copies of this publication which were sent to teachers in the district. On Arbor Day the staff distributed trees and other teaching materials to district schools.

The UEEP makes contact with various agencies to obtain various resources. The following resource agencies provided assistance this year:

Soil Conservation Service
Johnny Horizon
Pepco
Environmental Protection Agency
Forest Institute
National Wildlife Federation
U. S. Civil Defense
Agricultural Research Station
D. C. Lung Association
Federal Energy Administration
Thomas Alva Edison Foundation
Population Reference Bureau

Staff members participate in various types of community programs. During the past year, staff have been involved in a senior citizens workshop, Go Trash campaign, D. C. Lung, P.T.A., Garden Clubs and Board of Education meetings.

Upon request the UEEP reviews and evaluates programs of other agencies as a service. They review brochures, literature, movies, slides, lessons, activities, concepts, texts and full programs.

The criterion for objective five was met. Evidence here also supports objective three.

Objective 6: Project Staff will assist in arranging out-of-classroom learning experiences for students. Criterion will be log of trips arranged by staff and an average rating of 3.5 or better on a 5-point scale as to value of trips by teachers.

Table I indicated that 75 of the 79 teachers who rated the UEEP's coordination of environmental education trips said it was good or very good. To obtain supporting evidence and to confirm previous findings, a short questionnaire was mailed to a sample of 20 teachers randomly picked from those who had taken trips during the second semester. Only 11 were returned. Table V shows that all teachers indicated that the agency was prepared to receive their group. Ten of the 11 said that the activities at the field trip site were suitable to the grade level and educational level of the students. All 11 said that theactivity reinforced or enriched classroom activities very much. Nine of 11 said the activity met some of their objectives

TABLE V

TEACHERS' EVALUATION OF ENVIRONMENTAL EDUCATION FIELD TRIPS

N = 11

1. Was the agency prepared to receive your group? Yes 11 No 0

2. To what extent were activities suitable to grade level and educational level of students?

Unsuitable 0	Moderately suitable 1	Very suitable 10

3. To what extent did the activity reinforce or enrich classroom activities?

Not at all 0	Moderately 0	Very much 11

4. To what extent did activity meet your objectives for participating?

Met none 0	Met some 2	Met most 9

5. How do you value this program as a learning experience for your students?

Not at all 0	Moderately 0	Highly 11

6. How well do you think the students enjoyed the program?

Not at all 0	Enjoyed some activities 0	Enjoyed all activities 11

7. Would you like to participate next year? Yes 11 No 0

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for participating while the other 2 said that it met some of their objectives. All 11 said they valued the program highly as a learning experience for their students and all said they thought their students enjoyed all the activities associated with the program. Finally, all said they would like to participate again next year. It is quite clear that the criterion for objective six was greatly exceeded.

Objective 7: Information on environmental education will be disseminated on a regular basis through publication of the UEEP staff. Criterion will be existence of such publications and an average rating of 3.5 or better on a 5-point scale as to the value and utility of the information.

A questionnaire was given to Elementary Science Teachers as a representative group to determine the extent to which dissemination

activities were being carried out by the UEEP staff. Thirty-three teachers comprised the sample. Twenty-eight of the 33 said they had received the "Enviroline" which is published monthly by the UEEP (see Table VI).

TABLE VI

ELEMENTARY SCIENCE TEACHER QUESTIONNAIRE RESPONSES
N = 33*

1. Have you been receiving the monthly issue of the UEEP "Enviroline"? Yes 28 No 5

2. Approximately how many have you received?

   All 2 2 5 3 4 4 2 5 1 6 5

3. How helpful has it been?

   Excellent 14 Good 14 Fair 0 Poor 0

4. What other services have you or your school received?

   Trips 19 Resource packets 21 Equipment 2

   Curriculum Materials 13 Information 10

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

The questionnaire was designed for use at the end of the year, but was utilized earlier for data for the validation. There had been only 6 issues, therefore, the "all" and "6" response on item 2 were the same. Only 7 received all of the issues, indicating that the present method of distribution does not give teachers access to all issues.

The teachers were asked to rate the "Enviroline." Since only 28 had received it, only they could rate its helpfulness. Fourteen said it had been "excellent" while 14 more said it had been "good." For additional information they were asked to indicate other services which they or their school had received. Nineteen said they or someone in their school had taken a trip through UEEP, 21 had received resource packets, 2 had obtained equipment, 13 had received curriculum materials and 10 had received information (usually upon request). The criterion was a 3.5 on a 5-point scale. The scale employed in rating the "Enviroline" was a 4-point scale, therefore, the equivalent criterion would be 2.8 on a 4-point scale. The criterion was greatly exceeded on this objective.

Darton Geo-Science Program

The Darton Field Lab, a new Earth Science program, developed this year by the U. S. Geological Service was another program which the UEEP assisted

through its coordination efforts. The purpose of this new program was to provide experiences for minority students in Earth Science in order to enable them to explore this area as a potential career.

The program is located in the northeast corner of the National Zoological Park. The program is in operation from 10 to 2 on Monday, Wednesday and Friday. The UEEP obtained teachers who were interested in having their students participate in the Darton Field Lab experience which consisted of collecting basic data on air, water and soil, interpeting and graphing of past stream flow data from a gauging station, establishing a weather station and map construction. Additional activities available to students were the investigation of creek sediment, flood plain development and utilization, preparation of data tables, preparation of a teacher-student manual, preparation of a major report of all investigations and the correlation of the river and its container.

Nine teachers participated in the program. The UEEP provided a substitute for one day for each of the nine teachers so that they could attend an orientation session in which they were shown what the students would be doing and actually participated themselves in the activities. Teachers were encouraged to continue to have students conduct some experiments both at home and at school.

A total of 77 students originally indicated through the nine cooperating teachers that they would attend the Darton Field Lab. However, 23 never attended, leaving 54 who did participate. The highest number of days which a student could attend was six days. There were six students who attended all six sessions, five others attended five of the six, eight attended four sessions, twelve attended three, seventeen were present two days and six more only one day. The average attendance rate for the 54 students was 3.1 or a little over half the sessions. Attendance, however, was affected by transportation problems since the student had to get to the LAB on his own.

One school was brought in after the project began as a replacement and had only four sessions available, which affected the attendance rate slightly. Their performance, however, was better than the average of the total group.

Of the 54 who attended sessions, 32 received certificates for their work. Twenty-eight completed individual projects. The fact that the program was purely voluntary and transportation to and from was entirely the student's responsibility, the number receiving certificates and completing projects was very good and is a good indicator of the success of the program.

An effort was made to obtain some feel for the impact of the Darton Field Lab experience through student reaction. A reaction form was developed and disseminated to the nine cooperating teachers. The form was mailed the first week in June. High school and junior high students were in the midst of exams and were attending school only to take examinations and then they were free to go home. Only one teacher had his students complete the form and there were only four students who participated. The students rated the program highly, but the sample was too small to be included here in the evaluation. An attempt was made to obtain evaluative data from Darton Lab personnel, but it was not forwarded.

Mini-Grant Program

The mini-grant program was initiated in 1973-74 as an attempt to provide teachers and their students with the opportunity to obtain a small amount of money (up to $200) to conduct a program in environmental education. These were to be action oriented and were designed to get the students involved in a project.

Guidelines for the mini-grant were quite specific and well thought out. They required a minimum amount of interpretation. On November 14, 1974, the guidelines and announcements were mailed to each school in the school district. Principals were asked to bring the announcement to the attention of teachers, science clubs, ecology clubs and student councils. A deadline of December 6, 1974, was established. Few applications were received and subsequent investigation revealed that in many schools teachers were unaware of the fact that guidelines had been issued. On December 6, a second mailing occurred with a deadline date of December 19 established.

Staff provided assistance by telephone to most of the 37 who submitted proposals. These were reviewed during the early part of January. On January 21, 1975, notifications were mailed to 33 recipients asking acceptance replies to be forwarded by January 27. All 33 accepted. The four which were rejected were notified along with the reason for rejection. One was rejected because it did not deal with environmental education and three others were rejected because the same initiator submitted more than one proposal and the UEEP funded only one.

Projects began on February 3, 1975.

Objective 1: To give students and teachers an opportunity to initiate and carry out a project to study or solve an environmental problem of their choosing. Criterion will be existence of mini-grant proposals.

Mini-grant proposals did exist and as confirmed in the Interim Report 33 awards were made. The criterion was met.

Objective 2: At least 80 percent of the mini-grant projects will accomplish 70 percent of their objectives as determined by Project Staff and ERANDA staff. Criterion will be evidence, usually in the form of a product, which can be observed by staff and evaluators.

A Report Form for the Mini-Grant Activities was mailed to all project coordinators asking them to complete the form and forward it to UEEP headquarters as soon as possible. Nineteen of the 33 returned the form by June 25, 1975, which had been established as the cut-off date. Table VII indicates that 17 of the 19 teachers indicated that their students were very enthusiastic in carrying out their mini-grant program.

TABLE VII

MINI-GRANT COORDINATORS' RESPONSES TO REPORT FORM
N = 19*

Degree of enthusiasm shown by students

Very enthusiastic 17 Enthusiastic 2 Neither enthusiastic nor nonenthusiastic 0

Unenthusiastic 0 Very unenthusiastic 0

As a result of these mini-grant activities, what percentage of your students exhibited--

	100	75	50	25	0
1. An increase in awareness of environmental issues, (energy crisis, litter problems, pollution, recycling or soil conservation, individual responsibilities in environmental issues)?	8	10			
2. An increase in concern about the environment?	7	11			
3. An increase in knowledge about environmental issues?	9	7	1		
4. An increase in interest, or an improvement in their classwork, (such as reading, mathematics, science, art, or social studies)?	4	13			

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

How would you rate the amount of knowledge your students gained from the project?

Quite a lot 16 Some 3 A little 0 None 0

How would you rate the overall quality of your project?

Very good 13 Good 6 Fair 0 Poor 0 Very poor 0

Eight teachers said that 100 percent of their students exhibited an increase in awareness of environmental issues while 10 more said that 75 percent of their students had shown such an increased awareness. When asked the percentage of students showing increased environmental concern, 7 said 100 percent showed an increase while 11 said 75 percent showed increased concern. Nine of the teachers said 100 percent of their students showed an increase in knowledge about environmental issues, while 7 said 75 percent showed an increase inknowledge, while 1 said only half had shown an increase in knowledge. Four stated that 100 percent showed an increase in interest, or an improvement in their classwork while 13 said 75 percent showed this increase.

Sixteen of 19 said their students gained quite a lot from the project while the remaining 3 said their students gained some. When asked to rate the project overall, 13 rated it as very good and the remaining six rated their project as good.

Mini-grant coordinators also were asked to provide some products as a part of their report indicating the kinds of things the students did. Some reports consisted of pictures and slides. Some had student reports. Others had collages done by students and still others had displays which students had developed. Only six mini-grant coordinators had forwarded products in time for inclusion in this report. Past experience indicates, however, that these are forwarded during the summer after school is out and the teacher has had time to get things organized.

Lightship Field Trip

The Lightship is owned by the National Park Service which makes it available for student use. The UEEP staff cooperating with the National Park Service arranged for elementary and secondary classes to attend the Lightship. During the first semester 38 elementary classes totalling 1,140 children and 36 secondary classes (180 students) attended the Lightship. The second semester figures were 43 elementary classes and 34 secondary classes with 1,260 and 480 students respectively.

Objective 1: Students will show significant improvement in environmental knowledge and awareness after visiting the Lightship. Criterion will be significant improvement from pre to post by participating students.

A short 14-item test of knowledge was developed by UEEP staff for use with the Lightship Field Trip experience. The instrument was administered pre and post to six classes in April to determine the impact of the Lightship program on the students. Table VIII shows that there was a significant increase in scores from pre to post for the 111 students who were tested.

The pre-mean was 7.44 and the post-mean was 8.85 for a gain of 1.41 which was statistically significant beyond the .001 level of probability. Whether or not the gain is of practical significance is a matter for conjecture. The test did show that students were showing significant improvement from pre to posttesting thus meeting the criterion for the objective.

TABLE VIII

RESULTS OF CORRELATED T-TEST ON LIGHTSHIP FIELD TRIP EXAMINATION

Group	N	Pre-Mean	Post-Mean	Gain	t	Probability
Elementary students	111	7.44	8.85	1.41	7.79	.001

Objective 2: Students will evaluate Lightship Field Trip in positive way. Criterion will be an average rating of 3.5 on a 5-point scale by a random sample of participating students.

In May a random sample of 5 elementary school classes and 5 secondary school classes who had attended the Lightship during the second semester were sent questionnaires to ascertain their reactions and evaluations of the Lightship Field Trip experience. The only response came from the five elementary schools who all returned their completed questionnaires. The total sample of elementary students completing the questionnaire was 88. Table IX shows that 76 of the 88 students indicated that they were prepared for what was to occur when they went to the Lightship. The "no" responses

TABLE IX

RESPONSES TO STUDENT QUESTIONNAIRE ON LIGHTSHIP FIELD TRIP
N = 88*

Did someone tell you what was going to happen when you went to the Ligthship?

Yes 76 No 12

Did anyone explain why you were taking the trip?

Yes 75 No 13

When you went to the Ligthship, did you do the things you were told you were going to do?

Yes 81 No 7

How did you enjoy the trip?

Very much 75 A little 7 Not at all 4 No response 1

When you returned to the classroom after the trip, did you talk about what you had seen and done?

Yes 56 No 31

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

were scattered among all five of the schools and no real pattern developed, therefore, it probably was a matter of students forgetting or perhaps they were absent when the trip was discussed. On the second question asking whether anyone had explained why they were taking the trip, 75 of 88 said "yes." The 13 who said "no" were not necessarily the same children who said "no" to the previous question. Some who said they didn't know what was going to happen said someone did explain why they were making the trip. All but 7 said that when they went on the trip they did the things they had been told they were going to do. When the child was asked to indicate how he enjoyed the trip, 75 said they enjoyed it "very much," 7 said "a little" and only 4 said "not at all." One student did not respond to the question. Thirty-one students said they had not discussed what they had seen and done when they returned. Many of these students may have been in the class of the one teacher who indicated that she did not conduct a followup with her students after the trip (see Table XI).

The last item of the questionnaire was an open-ended question which asked the students to state some of the main ideas that they learned from the trip. The largest single response dealt with learning about water (water sampling primarily). From Table X it can be seen also that operation of the boat as well as safety was also uppermost in the minds of the students.

TABLE X

ELEMENTARY LIGHTSHIP STUDENT RESPONSES TO OPEN-ENDED QUESTION ON MAIN IDEAS LEARNED

References to working with water (water sampling, etc.)	21
How the boat works	20
The crew has to be good	12
Don't talk when the captain talks	11
Safety	8
Learned what the Lightship was	8
Learned about fish and animals	7
Learned about ecology (pollution)	4
Plankton	3
How to use the compass	2
Bacteria	2
Learned about maps	2
Learned nothing	2
How dirty the Chesapeake is	1

This is emphasized by the crew and is a necessary part of the experience, but as in past years, the students seem impressed by safety. Student responses this year more adequately reflect the educational purpose of the Ligthship experience. Students this year mentioned ecology, pollution, bacteria, plankton, fish and water.

At the same time a teacher questionnaire was also mailed with the student questionnaire. In two elementary schools, they were completed by

two teachers. Perhaps one was the classroom teacher and the other a science resource teacher, but since there was no way of telling they are included here.

Lightship personnel came to the school prior to the trip to the Lightship to provide orientation. The teachers indicated that they felt their students were prepared for the Lightship Field Trip confirming what the students had said (see Table XI). All the teachers indicated that they felt the field trip had met its educational objectives very adequately. All 7 rated the educational value of the trip as very good and all felt that the objectives of the Lightship Field Trip fit into their curriculum "very much." Six of the seven indicated they conducted a followup.

TABLE XI

LIGHTSHIP TEACHER RESPONSES TO QUESTIONNAIRE ON FIELD TRIP
N = 7

How well were your students prepared for the Lightship Field Trip?

Very well prepared	5
Prepared	2
Unprepared	0
Very Unprepared	0

To what extent did the field trip meet its educational objectives?

Very adequately	7
Adequately	0
Inadequately	0
Very inadequately	0

How would you rate the educational value of the trip for your students?

Very good	7
Good	0
Fair	0
Poor	0
Very poor	0

To what extent did the objectives of the Lightship Field Trip fit into your curriculum?

Very much	7
Some	0
A little	0
Not at all	0

Did you conduct a followup in class after the students took their trip?

Yes 6 No 1

Lightship Teacher Workshop Evaluation. Teachers who plan to bring their students to the Lightship for the field trip experience are given a one-day workshop at the beginning of the semester in which the trip is planned. In many cases the Elementary Science Resource Teacher is responsible for three or four classes within a building. This accounts for the small number of teachers during the first semester. The elementary and secondary teachers experienced the workshop at different times. After the workshop had been completed, the teachers were asked to complete an evaluation form. Eight elementary teachers and 7 secondary teachers completed the form in September. The results are given in Tables XII and XIII. Seven of the elementary teachers

TABLE XII

ELEMENTARY TEACHER EVALUATIONS OF LIGHTSHIP WORKSHOP

N = 8*

1. Were your objectives met? Yes 7 No 1

2. Mark an X to show how much of the learning material you already knew before doing the activity.

I knew	I knew some	I knew all
0 nothing	8 of what it taught	0 that it taught

3. Mark an X to show how you would rate its difficulty.

Too easy to	Quite	Perfect balance	Quite
0 be useful	1 easy	4 in difficulty	0 difficult

0 Too difficult to be useful

4. Mark an X to show how clear the procedures were.

I could not figure out what	Directions were hard	I had minor
0 to do at all	0 to understand	2 difficulties

Directions were	I could follow
3 clear enough	2 directions very easily

5. Mark an X to show how clear the workshop's purposes were when you finished.

I still have no idea of	I was a little	Clear	Perfectly
0 its purpose	0 uncertain	5 enough	2 clear

6. Mark an X to show how well you think the workshop achieved its purpose.

It doesn't	It achieves	Well	
0 even begin	0 a little	7 enough	1 Perfectly

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

said their objectives in coming to the workshop were met while one indicated that they were not completely met. All the secondary teachers indicated their objectives had been met. All the elementary and all but one of the secondary teachers indicated they knew some of the learning material before the workshop. Four of the elementary teachers indicated perfect balance in difficulty, one said it was quite easy and three did not respond to the item on difficulty. Six secondary teachers indicated perfect balance in difficulty, with one indicating it was quite easy. On clarity of procedures two elementary and one secondary teacher indicated some minor difficulties were encountered, 6 said it was clear and 5 said it was very easy. They all indicated the purpose of the workshop was clear and all indicated that those purposes were achieved.

TABLE XIII

SECONDARY TEACHER EVALUATIONS OF LIGHT WORKSHOP

1. Were your objectives met? Yes 7 No 0

2. Mark an X to show how much of the learning material you already knew before doing the activity.

I knew	I knew some	I knew all
0 nothing	6 of what it taught	1 that it taught

3. Mark an X to show how you would rate its difficulty.

Too easy to	Quite	Perfect balance	Quite
0 be useful	1 easy	6 in difficulty	0 difficult

4. Mark an X to show how clear the procedures were.

I could not figure out what	Directions were hard	I had minor
0 to do at all	0 to understand	1 difficulties

Directions were	I could follow
3 clear enough	3 directions very easily

5. Mark an X to show how clear the workshop's purposes were when you finished.

I still have no idea of	I was a little	Clear	Perfectly
0 its purpose	0 uncertain	2 enough	5 clear

6. Mark an X to show how well you think the workshop achieved its purpose.

It doesn't	It achieves	Well	
0 even begin	0 a little	4 enough	3 Perfectly

In January, the workshop evaluation form was changed. The evaluation form was given to the elementary teachers and the results are basically the same. Eighteen of 23 teachers agreed strongly that the Lightship Workshop was educational (see Table XIV). Twenty agreed that they would be able to prepare their students for the trip. Seventeen agreed that the activities in the program were relevant to the students' experiences.

TABLE XIV

ELEMENTARY TEACHER EVALUATIONS OF LIGHTSHIP WORKSHOP
Second Semester
N = 23*

	Strongly Disagree		Undecided		Strongly Agree
	1	2	3	4	5
1. The workshop was educational to me.	1	0	1	3	18
2. I feel that I will be able to prepare my students for their visit.	1	0	2	10	10
3. The activities in the program are relevant to the students' experiences.	1	0	4	6	11
4. This type of program is a valuable addition to the students' education.	1	0	0	3	19
5. The activities relate to the existing curricula.	0	0	8	6	8
6. There is ample opportunity for student involvement.	0	1	1	9	12
7. I will be able to assist with the instruction of my students when they visit.	0	0	6	7	10

*Variance between N returning questionnaire and N per item is due to non-response by some who returned the instrument.

All but one agreed that this type program is a valuable addition to the students' education. Fourteen agreed that the activities relate to the existing curriculum. All but 2 agreed that there is ample opportunity for student involvement. Six were undecided and the rest agreed that they would be able to assist with the instruction of their students when they visit.

When teachers were asked what part of the workshop was most helpful to them, 7 said pilot house with charts and maps, 5 said the aquarium presentation and 4 said the lab work. These were the most representative responses. There was no particularly dominant response to the question "What was least helpful?" Teachers suggested that the workshop should be held on a school day (5). There was no major suggestion for improving the Lightship Field Trip, but two teachers did indicate that student manuals, which are given out at the orientation session, should be given to teachers at the workshop.

Pilot Schools

This particular component received little or no attention this year due to the demands placed upon the staff for other services and for preparation for the visit by the validation team. As a result the pilot schools received only a few extra resources and no extra attention. Again the evaluation contract was not awarded until May and no pre and posttesting was possible. It was decided, however, that an attempt should be made to ascertain the impact of the Urban Environmental Education Project on the students who had been benefitting from their services.

The Evaluation Team developed an instrument in cooperation with UEEP staff. The instrument was an Environmental Attitude and Awareness Test. Section I was the attitude section and consisted of 22 items to which students were asked to respond "Disagree," "Don't know" or "Agree." Section II consisted of 7 true-false items and 12 multiple choice items and constituted the awareness portion of the instrument.

The instrument was to be administered to 5 involved classes and 3 non-involved classes as designated by the teachers themselves in these classes. Arrangements were made by a UEEP staff member for testing the last week in May. The Evaluation Team had indicated that they wished to observe at least one of the testing situations. A mix-up then occurred when the staff member who had contacted the teachers went on vacation and ERANDA called to indicate that they could not make it on the date which they had originally scheduled for observation. This day there had been four classes scheduled for testing. The UEEP staff member in charge, thinking that ERANDA staff had to be present, cancelled the testing. Subsequently, teachers who had indicated they would cooperate now stated they did not have time to reschedule the test.

One class, however, did go ahead with the testing. This class was an involved class and the responses of the students can give an indication of the attitude and awareness of elementary school students involved in an environmental education program. We cannot, however, conclude that this was a result of UEEP activities since there is no baseline data.

The attitude section of the instrument was scored as a 1, 2 or 3 for the response to each of 22 statements. The scores per item were then summed over all 22 items to give a summary score. An extremely poor attitude would be a summary score of 22 while an extremely good attitude would be 66. A 44 would indicate a neutral attitude. Table XV indicates that the mean for the group was 53.69 which indicated a very good attitude

TABLE XV

MEAN AND STANDARD DEVIATION ON ATTITUDE TOWARD ENVIRONMENT FOR ONE INVOLVED FIFTH GRADE CLASS

Group	N	Mean	Standard Deviation
Fifth-grade class	26	53.69	3.98

toward the environment. The standard deviation indicates that the group was fairly homogeneous. A look at the scores themselves also depicts this when the range of scores was from 45 (just above neutral) to 61, which was the highest.

The Awareness section of the instrument consisted of 19 items. These items were selected by UEEP staff because they reflected content areas in which instructional or other educational materials had been given to the teachers. Teachers, however, were under no obligation to use any of these materials. Therefore, there may have been little or no exposure in some of the content areas which items reflected. In this section items were either correct or incorrect. The maximum score was 19 and the lowest was zero. The mean for the group was 9.0 (see Table XVI), while the standard deviation was 1.66. The group again was quite homogeneous. The range of scores was from 5 to 12. The results of this portion were somewhat disappointing. However, these items were more cognitively oriented and if the child were not exposed to the subject matter area his performance would be somewhat depressed.

TABLE XVI

MEAN AND STANDARD DEVIATION ON AWARENESS OF ENVIRONMENT TEST FOR ONE INVOLVED FIFTH GRADE CLASS

Group	N	Mean	Standard Deviation
Fifth-grade class	27	9.0	1.66

Conclusions

The following conclusions may be drawn from the findings of this evaluation:

1. Teachers perceived the services received from the UEEP as being good to very good.

2. Teachers participating in faculty workshops perceived their students as showing increased awareness of the environment, more environmental concern, increased environmental knowledge and more academic interest and/or achievement.

3. Teachers' evaluations of an Environmental Education Worshop were all favorable.

4. Pre-Service Teachers evaluated favorably an Environmental Education Workshop conducted for them by UEEP staff.

5. Teachers evaluated environmental field trips very highly.

6. The "Enviroline" was rated as good or excellent by Elemertary Science Teachers.

7. Students who were able to attend the Darton Geo-Science Program on a somewhat regular basis completed program objectives as attested by the certificates awarded to them.

8. Mini-grant coordinators perceived their students as being enthusiastic, gaining knowledge and increasing awareness, concern and interest in the environment. They saw their program as being good or very good.

9. Students gained knowledge from their Lightship Field Trip experience.

10. Students enjoy the Lightship Field Trip.

11. Sound techniques for field trips were followed by most teachers whose students were involved in the Lightship Field Trip.

12. The Lightship Workshop for teachers is effective in achieving its purpose.

Recommendations

1. Most components of the project should be continued, but the pilot schools should be dropped since staff will be reduced and not enough time will be available.

2. Concentration of effort should occur at the elementary grades where response is better.

3. Improve Lightship Test and determine impact on a small sample of participating students by pre and posttesting.

4. Conduct more workshops for District of Columbia teachers.